04CO
5-10-01

Atty. Docket No. <u>678-649 (P9792)</u>

#2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Yong Chang

SERIAL NO.: 09/833,986

FILED: April 12, 2001

FOR: METHOD FOR PROVIDING CONCURRENT SERVICE
HARD HANDOFF IN A MOBILE COMMUNICATION
SYSTEM

Dated: May 2, 2001

Assistant Commissioner
  for Patents
Washington, D.C. 20231

ATTN: Official Draftsperson

TRANSMITTAL OF FORMAL DRAWINGS

Sir:

       Applicant submits herewith eighteen (18) sheets of formal drawings

depicting FIGS. 1-10 for this application.

Respectfully submitted,

Paul J. Farrell
Reg. No. 33,494
Attorney for Applicant(s)

DILWORTH & BARRESE
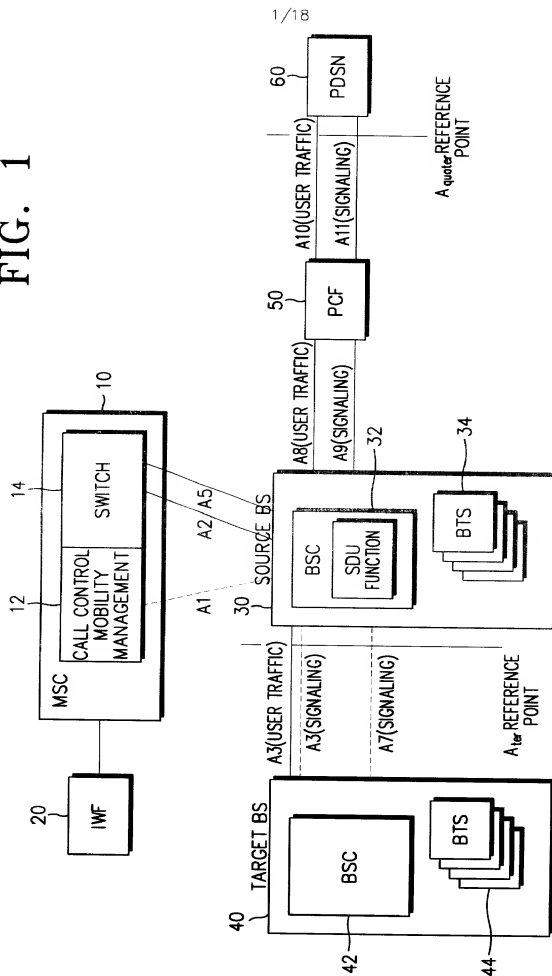**333 Earle Ovington Blvd.**
Uniondale, NY 11553
(516) 228-8484

FIG. 1

FIG. 2

```
┌─────────────────────────────────┐
│ RECEIVE PSMM AND DETERMINE      │
│     WHETHER TO PERFORM          │──10
│          HANDOFF                │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│      CREATE HANDOFF             │
│   REQUIRED MESSAGE WITH         │──11
│ SINGLE SERVICE OPTION AND       │
│   ASSOCIATED IS-2000 SCR        │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│       SEND HANDOFF              │──12
│     REQUIRED MESSAGE            │
└─────────────────────────────────┘
```

FIG. 3

FIG. 4

FIG. 5

INFORMATION ELEMENT
MESSAGE TYPE
CAUSE
CELL IDENTIFIER LIST(TARGET)
CLASSMARK INFORMATION TYPE2
RESPONSE REQUEST
ENCRYPTION INFORMATION
IS-95 CHANNEL IDENTITY
MOBILE IDENTITY(ESN)
DOWNLINK RADIO ENVIRONMENT
SERVICE OPTION
CDMA SERVING ONE WAY DELAY
IS-95 MS MEASURED CHANNEL IDENTITY
IS-2000 CHANNEL IDENTITY
QUALITY OF SERVICE PARAMETERS
IS-2000 MOBILE CAPABILITIES
IS-2000 SERVICE CONFIGURATION RECORD
PDSN IP ADDRESS
PROTOCOL TYPE
PACKET ZONE ID
SERVICE OPTION CONNECTION REFERENCE

FIG. 6

7	6	5	4	3	2	1	0	Octet
BSMAP HEADER: MESSAGE DISCRIMINATION = [00H]								1
LENGTH INDICATOR (LI) = <VARIABLE>								2
MESSAGE TYPE = [04H]								1
CAUSE: A1 ELEMENT IDENTIFIER = [04H]								1
LENGTH = [01H]								2
ext=[0]	CAUSE VALUE = [0EH, 0FH] (BETTER CELL, INTERFERENCE)							3
CELL IDENTIFIER LIST(TARGET):A1 ELEMENT IDENTIFIER = [1AH]								1
LENGTH = <VARIABLE>								2
CELL IDENTIFICATION DISCRIMINATOR=[02H,07H]								3
IF(DISCRIMINATOR=02H), CELL IDENTIFICATION {1+:								
(MSB)	CELL=[001H–FFFH]							j
			(LSB)	SECTOR=[0H–FH](0H=OMINI)				j+1
}OR IF (DISCRIMINATOR=07H), CELL IDENTIFICATION{1+:								
(MSB)								j
MSCID=<ANY VALUE>								j+1
							(LSB)	j+2
(MSB)	CELL=[001H–FFFH]							j+3
			(LSB)	SECTOR=[0H–FH](0H=OMINI)				j+4
}CELL IDENTIFICATION								
CLASSMARK INFORMATION TYPE 2:A1 ELEMENT IDENTIFIER=[12H]								1
LENGTH=<VARIABLE>								2
MOBILE P_REV =[000–111]		RESERVED =[0]	SEE LIST OF ENTRIES= [1]	RF POWER CAPABILITY=[000] (CLASS 1,VEHICALE & PORTABLE)				3
RESERVED=[00H]								4
NAR_ AN_ CAP =[0,1]	IS–95 =[1]	SLOTTED =[0,1]	RESERVED=[00]		DTX =[0,1]	MOBILE TERM =[0,1]	RESERVED =[0]	5

FIG. 7A

--CONTINUED ON Fig.7a--			Octet
RESERVED=[00H]			6
RESERVED=[0000 00]	MOBILE TERM =[0,1]	PSI =[0,1]	7
SCM LENGTH=[01H–05H]			8
STATION CLASS MARK=[00H–FFH]			9
COUNT OF BAND CLASS ENTRIES=[01H–20H]			10
BAND CLASS ENTRY LENGTH=[03H]			11
MOBILE BAND CLASS CAPABILITY ENTRY {1+:			
RESERVED=[000]	BAND CLASS n=[0000–1111]		k
RESERVED=[000]	BAND CLASS n AIR INTERFACES SUPPORTED=[0000–1111]		k+1
BAND CLASS n MS PROTOCOL LEVEL=[00H–FFH]			k+2
}MOBILE BAND CLASS CAPABILITY ENTRY			
RESPONSE REQUEST: A1 ELEMENT IDENTIFIER=[1BH]			1
ENCRYPTION INFORMATION: A1 ELEMENT IDENTIFIER=[0AH]			1
LENGTH=<VARIABLE>			2
ENCRYPTION INFO{0..4:			
IF(ENCRYPTION PARAMETER IDENTIFIER=0001) {1:			
ext=[1] ENCRYPTION PARAMETER IDENTIFIER= [00001 (SME), 00101 (DATAKEY(ORYX)), 00110(INITIAL RAND)]	STATUS =[0,1]	AVAILABLE =[0,1]	j
ENCRYPTION PARAMETER LENGTH=[08H]			j+1
(MSB)			j+2
			j+3
			j+4
ENCRYPTION PARAMETER VALUE=<ANY VALUE>			j+5
			j+6
			j+7
			j+8
		(LSB)	j+9
--CONTINUED ON Fig.7c--			

FIG. 7B

--CONTINUED ON Fig.7b--	Octet

}OR IF (ENCRYPTION PARAMETER IDENTIFIER=00100){1:				
ext=[1]	ENCRYPTION PARAMETER IDENTIFIER=[00100] (PRIVATE LONGCODE)	STATUS =[0,1]	AVAILABLE =[0,1]	j
UNUSED=[000000]			(MSB)	j+1
				j+2
				j+3
ENCRYPTION PARAMETER VALUE=<ANY VALUE>				j+4
				j+5
				j+6
			(LSB)	j+7
}ENCRYPTION INFO				

IS-95 CHANNEL IDENTITY: A1 ELEMENT IDENTIFIER=[22H]	1
LENGTH=<VARIABLE>	2

HARD HANDOFF =[1]	NUMBER OF CHANNELS TO ADD=[001]	FRAME OFFSET=[0H–FH]	3
{1+:			
WALSH CODE CHANNEL INDEX=<ANY VALUE>			4
PILOT PN CODE (LOW PART)=<ANY VALUE>			5

PILOT PN CODE (HIGH PART) =[0,1]	POWER COMBINED =[0]	Freq. INCLUDED =[1]	RESERVED=[00]	ARFCN(HIGH PART) =[000–111]	6
ARFCN(LOW PART)=[00H–FFH]					7
}					

MOBILE IDENTITY(ESN): A1 ELEMENT IDENTIFIER=[0DH]	1
LENGTH=[05H]	2

IDENTITY DIGIT 1=[0000]	ODD/EVEN INDICATOR =[0]	TYPE OF IDENTITY =[101](ESN)	3
(MSB)			4
ESN=<ANY VALUE>			5
			6
		(LSB)	7

--CONTINUED ON Fig.7d--	

FIG. 7C

DOWNLINK RADIO ENVIRONMENT: A1 ELEMENT IDENTIFIER=[29H]	1
LENGTH=<VARIABLE>	2
NUMBER OF CELLS=<VARIABLE>	3
CELL IDENTIFICATION DISCRIMINATOR=[02H,07H]	4
DOWNLINK RADIO ENVIRONMENT{1+:	
IF (DISCRIMINATOR=02H), CELL IDENTIFICATION{1:	
(MSB) CELL=[001H–FFFH]	j
(LSB) SECTOR=[0H–FH](0H=OMNI)	j+1
}OR IF(DISCRIMINATOR=07H), CELL IDENTIFICATION {1:	
(MSB)	j
MSCID=<ANY VALUE>	j+1
(LSB)	j+2
(MSB) CELL=[001H–FFFH]	j+3
(LSB) SECTOR=[0H–FH](0H=OMNI)	j+4
}CELL IDENTIFICATION	
RESERVED=[00] DOWNLINK SIGNAL STRENGTH RAW=[000000–111111]	k
(MSB) CDMA TARGET ONE WAY DLAY=[0000H–FFFFH](x100ns)	k+1
(LSB)	k+2
}DOWNLINK RADIO ENVIRONMENT	
SERVICE OPTION: A1 ELEMENT IDENTIFIER=[03H]	1
(MSB) SERVICE OPTION	2
=[8000H(13K SPEECH), (LSB) 0011H(13K HIGH RATE VOICE SERVICE), 0003H(EVRC), 801FH(13K MARKOV), 0009H(13K LOOPBACK), 0004H(Async DATA RATE SET 1), 0005H(G3 FAX RATE SET 1), 000CH(Async DATA RATE SET 2), 000DH(G3 FAX RATE SET 2), 0006H(SMS RATE SET 1), 000EH(SMS RATE SET 2) 0021H(PACKET DATA), 0012H(OTAPA RATE SET 1), 0013H(OTAPA RATE SET 2)]	3

FIG. 7D

--CONTINUED ON Fig.7d--	
CDMA SERVING ONE WAY DELAY: A1 ELEMENT IDENTIFIER=[0CH]	1
LENGTH=<VARIABLE>	2
CELL IDENTIFICATION DISCRIMINATOR=[03H,06H]	3
IF(DISCRIMINATOR=02H), CELL IDENTIFICATION {1:	

(MSB)	CELL=[001H-FFFH]		j
	(LSB)	SECTOR=[0H-FH](0H=OMNI)	j+1

}OR IF(DISCRIMINATOR=07H), CELL IDENTIFICATION {1:			
(MSB)			j
	MSCID=<ANY VALUE>		j+1
		(LSB)	j+2
(MSB)	CELL=[001H-FFFH]		j+3
	(LSB)	SECTOR=[0H-FH](0H=OMNI)	j+4

}CELL IDENTIFICATION	
(MSB) CDMA SERVING ONE WAY DELAY=[0000H-FFFFH](x100ns)	k

	(LSB)	k+1

IS-95 MS MEASURED CHANNEL IDENTITY: A1 ELEMENT IDENTIFIER=[64H]		1
LENGTH=<VARIABLE>		2
BAND CLASS=[00000-11111]	ARFCN(HIGH PART)=[000-111]	3
ARFCN(LOW PART)=[00H-FFH]		4

IS-2000 CHANNEL IDENTITY: A1 ELEMENT IDENTIFIER=[09H]				1
LENGTH=<VARIABLE>				2
RESERVED=[0000]		FRAME OFFSET=[0H-FH]		3
CHANNEL INFORMATION {1+:				
PHYSICAL CHANNEL TYPE= [01H(FUNDAMENTAL CHANNEL-FCH-IS-2000), 02H(DEDICATED CONTROL CHANNEL-DCH-IS-2000)]				4n
RESERVED =[0]	PILOT GATING RATE =[00,01,10]	QOF MASK =<ANY VALUE>	WALSH CODE CHANNEL INDEX (HIGH PART)=<ANY VALUE>	4n+1
WALSH CODE CHANNEL INDEX(LOW PART)=<ANY VALUE>				4n+2
PILOT PN CODE (LOW PART)=<ANY VALUE>				4n+3
--CONTINUED ON Fig.7f--				

FIG. 7E

--CONTINUED ON Fig.7e--	
PILOT PN CODE (HIGH PART) =[0,1]	RESERVED=[000]	Freq. INCLUDED =[1]	ARFCN(HIGH PART) =[000-111]	6
	ARFCN(LOW PART)=[00H-FFH]	7
} CHANNEL INFORMATION	
	QUALITY OF SERVICE PARAMETERS: A1 ELEMENT IDENTIFIER=[07H]	1
	LENGTH=[01H]	2
	RESERVED=[0000]		PACKET PRIORITY=[0000-1101]	3
	IS-2000 MOBILE CAPABILITIES: AL ELEMENT IDENTIFIER=[11H]	1
	LENGTH=<VARIABLE>	2

Field	Value	Octet
--CONTINUED ON Fig.7e--		
PILOT PN CODE (HIGH PART) =[0,1] RESERVED=[000] Freq. INCLUDED =[1] ARFCN(HIGH PART) =[000-111]		6
ARFCN(LOW PART)=[00H-FFH]		7
} CHANNEL INFORMATION		
QUALITY OF SERVICE PARAMETERS: A1 ELEMENT IDENTIFIER=[07H]		1
LENGTH=[01H]		2
RESERVED=[0000] PACKET PRIORITY=[0000-1101]		3
IS-2000 MOBILE CAPABILITIES: AL ELEMENT IDENTIFIER=[11H]		1
LENGTH=<VARIABLE>		2
RESERVED =[00] DCCH SUPPORTED =[0,1] FCH SUPPORTED =[0,1] OTD SUPPORTED =[0,1] OTD INFO INCLUDED =[0,1] ENHANCED RC CFG SUPPORTED =[0,1] QPCH SUPPORTED =[0,1]		3
RESERVED =[00] FORWARD RC PREFERRED= [0 0001(RADIO CONFIGURATION 1), 0 0010(RADIO CONFIGURATION 2), 0 0011(RADIO CONFIGURATION 3), 0 0100(RADIO CONFIGURATION 4), 0 0101(RADIO CONFIGURATION 5), 0 0110(RADIO CONFIGURATION 6), 0 0111(RADIO CONFIGURATION 7), 0 1000(RADIO CONFIGURATION 8), 1 0001(RADIO CONFIGURATION 9)] FORWARD RC Pref. INCLUDED =[0,1]		4
RESERVED =[00] REVERSE RC PREFERRED= [0 0001(RADIO CONFIGURATION 1), 0 0010(RADIO CONFIGURATION 2), 0 0011(RADIO CONFIGURATION 3), 0 0100(RADIO CONFIGURATION 4), 0 0101(RADIO CONFIGURATION 5), 0 0110(RADIO CONFIGURATION 6), REVERSE RC Pref. INCLUDED =[0,1]		5
FCH INFORMATION: BIT-EXACT LENGTH-Octet COUNT =[00H TO FFH]		6
RESERVED =[0000 0] FCH INFORMATION: BIT-EXACT LENGTH-FILL BITS =[000 TO 111]		7
--CONTINUED ON Fig.7g--		

FIG. 7F

--CONTINUED ON Fig.7f--

(MSB)	8
FCH INFORMATION CONTENT =<ANY VALUE>	. . .
SEVENTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SIXTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIFTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FOURTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | THIRD FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SECOND FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIRST FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)]	k
DCCH INFORMATION: BIT-EXACT LENGTH-Octet COUNT =[00H TO FFH]	k+1
RESERVED=[0000 0] | DCCH INFORMATION BIT-EXACT LENGTH-FILL BITS=[000 TO 111]	k+2
(MSB)	k+3
DCCH INFORMATION CONTENT =<ANY VALUE>	. . .
SEVENTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SIXTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIFTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FOURTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | THIRD FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SECOND FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIRST FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)]	m
IS-2000 SERVICE CONFIGURATION RECORD: A1 ELEMENT IDENTIFIER=[0EH]	1
BIT-EXACT LENGTH-Octet COUNT=<VARIABLE>	2
RESERVED=[0000 0] | BIT-EXACT LENGTH-FILL BITS=[000 - 111]	3
(MSB)	4
IS-2000 SERVICE CONFIGURATION RECORD CONTENT=<ANY VALUE>	. . .
SEVENTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SIXTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIFTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FOURTH FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | THIRD FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | SECOND FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)] | FIRST FILL BIT-IF NEEDED =[0(IF USED AS A FILL BIT)]	k

--CONTINUED ON Fig.7h--

FIG. 7G

--CONTINUED ON Fig.7g--

PDSN IP ADDRESS: A1 ELEMENT IDENTIFIER=[14H]	1
LENGTH=[04H]	2
(MSB)	3
PDSN IP ADDRESS=<ANY VALUE>	4
	5
(LSB)	6
PROTOCOL TYPE: A1 ELEMENT IDENTIFIER=[18H]	1
LENGTH=[02H]	2
(MSB) PROTOCOL TYPE=[88 OBH](PPP)	3
(LSB)	4
PACKET ZONE ID: A1 ELEMENT IDENTIFIER=[xxH]	1
(MSB) PACKET ZONE ID (LSB)	2
SERVICE OPTION CONNECTION REFERENCE: A1 ELEMENT IDENTIFIER=[xxH]	1
LENGTH=[013H]	2
RESERVED=[000000] SOC_NUM=1	3
(MSB) SERVICE OPTION 1	4
=[8000H (13K SPEECH), (LSB) 0011H (13K HIGH RATE VOICE SERVICE), 0003H (EVRC), 801FH (13K MARKOV), 0009H (13K LOOPBACK), 0004H (Async DATA RATE SET 1), 0005H (G3 FAX RATE SET 1), 000CH (Async DATA RATE SET 2), 000DH (G3 FAX RATE SET 2), 0006H (SMS RATE SET 1), 000EH (SMS RATE SET 2), 0021H (PACKET DATA), 0012H (OTAPA RATE SET 1), 0013H (OTAPA RATE SET 2)]	5
(MSB)	6
SERVICE OPTION 1 CONNECTION REFERENCE=<ANY VALUE>	7
	8
(LSB)	9

--CONTINUED ON Fig.7i--

FIG. 7H

--CONTINUED ON Fig.7h--

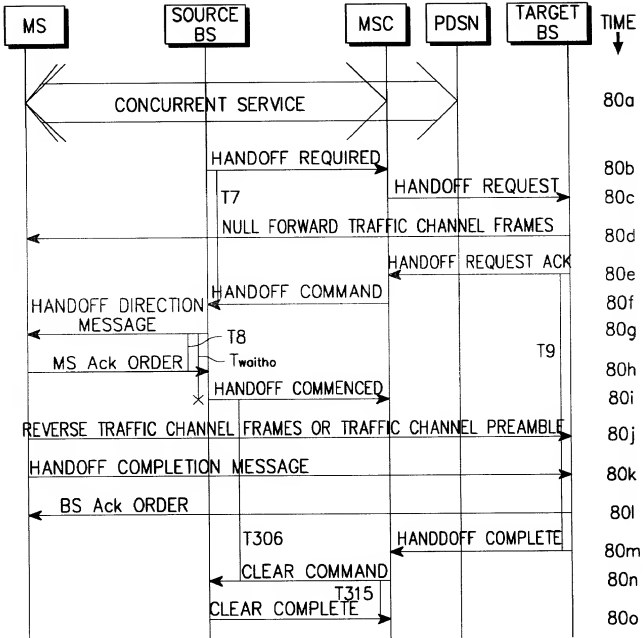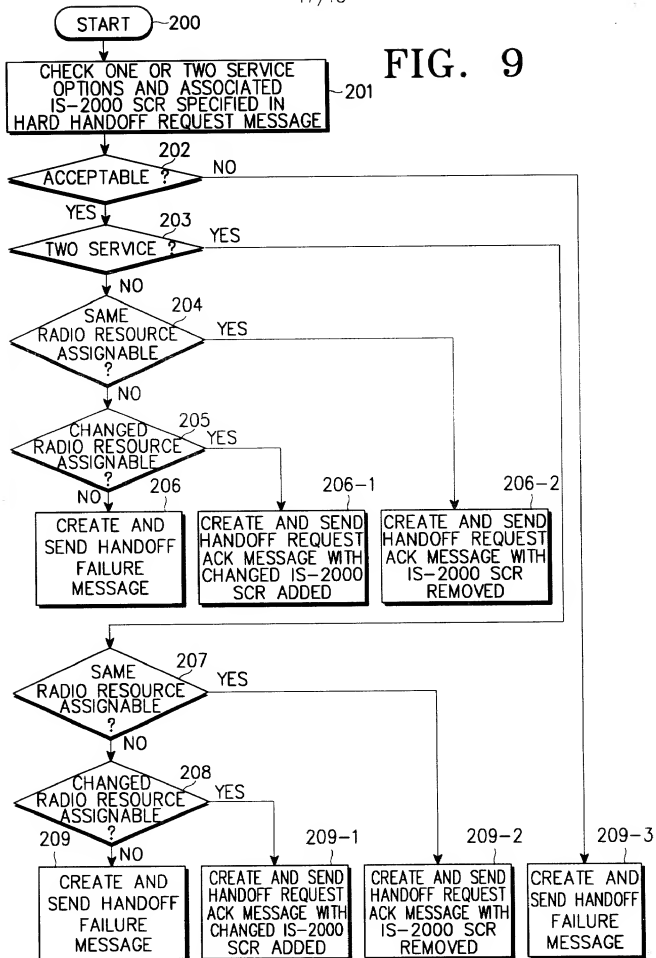|		
(MSB) SERVICE OPTION 2		10
=[8000H (13K SPEECH), 0011H (13K HIGH RATE VOICE SERVICE), 0003H (EVRC), 801FH (13K MARKOV), 0009H (13K LOOPBACK), 0004H (Async DATA RATE SET 1), 0005H (G3 FAX RATE SET 1), 000CH (Async DATA RATE SET 2), 000DH (G3 FAX RATE SET 2), 0006H (SMS RATE SET 1), 000EH (SMS RATE SET 2), 0021H (PACKET DATA), 0012H (OTAPA RATE SET 1), 0013H (OTAPA RATE SET 2)]	(LSB)	11
(MSB)		12
SERVICE OPTION 2 CONNECTION REFERENCE=<ANY VALUE>		13
		14
	(MSB)	15

FIG. 7I

FIG. 8

FIG. 9

START ~200

CHECK ONE OR TWO SERVICE
OPTIONS AND ASSOCIATED
IS-2000 SCR SPECIFIED IN
HARD HANDOFF REQUEST MESSAGE ~201

202
ACCEPTABLE ? — NO

YES ↓ 203
TWO SERVICE ? — YES

NO ↓
204
SAME RADIO RESOURCE ASSIGNABLE ? — YES

NO ↓
205
CHANGED RADIO RESOURCE ASSIGNABLE ? — YES

NO ↓ 206

206
CREATE AND SEND HANDOFF FAILURE MESSAGE

206-1
CREATE AND SEND HANDOFF REQUEST ACK MESSAGE WITH CHANGED IS-2000 SCR ADDED

206-2
CREATE AND SEND HANDOFF REQUEST ACK MESSAGE WITH IS-2000 SCR REMOVED

207
SAME RADIO RESOURCE ASSIGNABLE ? — YES

NO ↓
208
CHANGED RADIO RESOURCE ASSIGNABLE ? — YES

209 ↓ NO

209
CREATE AND SEND HANDOFF FAILURE MESSAGE

209-1
CREATE AND SEND HANDOFF REQUEST ACK MESSAGE WITH CHANGED IS-2000 SCR ADDED

209-2
CREATE AND SEND HANDOFF REQUEST ACK MESSAGE WITH IS-2000 SCR REMOVED

209-3
CREATE AND SEND HANDOFF FAILURE MESSAGE

INFORMATION ELEMENT
MESSAGE TYPE
CHANNEL TYPE
ENCRYPTION INFORMATION
CLASSMARK INFORMATION TYPE2
CELL IDENTIFIER LIST(TARGET)
CIRCUIT IDENTIFIER CODE EXTENSION
IS-95 CHANNEL IDENTITY
MOBILE IDENTITY(IMSI)
MOBILE IDENTITY(ESN)
DOWNLINK RADIO ENVIRONMENT
SERVICE OPTION
CDMA SERVING ONE WAY DELAY
IS-95 MS MEASURED CHANNEL IDENTITY
IS-2000 CHANNEL IDENTITY
QUALITY OF SERVICE PARAMETERS
IS-2000 MOBILE CAPABILITIES
IS-2000 SERVICE CONFIGURATION RECORD
PDSN IP ADDRESS
PROTOCOL TYPE
PACKET ZONE ID
SERVICE OPTION CONNECTION REFERENCE

FIG. 10